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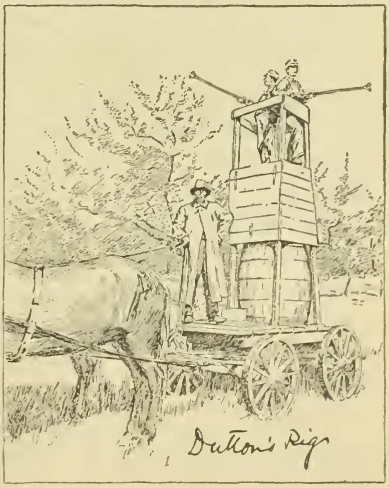
MAINE AGRICULTURAL EXPERIMENT STATION.

BULLETIN No. 29.

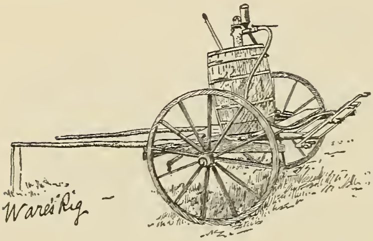
NOTES ON SPRAYING.

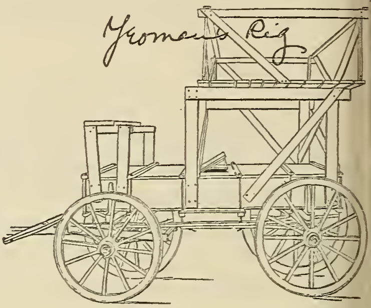
The fact that insect and fungous enemies of the orchard may be held in check by careful attention to spraying with certain materials, has been so often and so plainly demonstrated that further proof seems unnecessary. By our more progressive farmers the practice is now looked upon as a necessity in successful orchard management, and there are frequent requests for information. To meet these inquiries, and to again call the matter to the attention of others, a brief review of the subject seems desirable at this time. Some points will be more fully discussed in the annual report for the current year.

Preparation for the work.—If not already attended to, the necessary pumps and nozzles should at once be secured; likewise the chemicals—except the lime for Bordeaux mixture which should be fresh when used. If a pump is already at hand it should be be examined and the packing of the valves should be renewed. Be sure also that the hose is in good condition, as otherwise much valuable time may be lost later in the season.



It is advisable at this time also to prepare the necessary wagon or cart for use when spraying. In low-headed orchards an ordinary stone-boat or low wagon may serve the purpose well, but in many cases a rig similar to one of those figured will be found advantageous.*





What is the best pump?—There are so many good pumps on the market at present it is not easy to give a specific answer to the question. The "Eclipse" made by Morrill & Morley, Benton Harbor, Mich., is highly recommended by some, but personally I have not used this form. The Field Force Pump Co., Lockport, N. Y.; The Goulds Mfg. Co., Seneca, Falls, N. Y.; The Deming Co., Salem, Ohio; W. & B. Douglas, Middletown, Conn., and many other reliable firms are sending out very good pumps. These firms will all send catalogues free on application.

The best nozzle that we have used is the "McGowen," made by John J. McGowen, Ithaca, N. Y., and costs $1.00.

When to spray, and why.—No definite time for beginning the work can be stated as this will depend on the season and on the object in view. It is of course understood that the arsenites—of which Paris green is preferred—are used to destroy insects which eat the leaves or fruit, such as bud-moth, canker-worm, codling-moth, etc. The copper salts, of which the best preparation is the Bordeaux mixture, are used to prevent the spread of fungous diseases such as apple scab, brown rot, etc. If the two classes of enemies are to be met, the remedies may be applied at one operation.

In general our recommendation for preventing apple scab would be to spray with Bordeaux mixture just before the fruit buds open, again with the same just as the blossoms fall, and repeat the operation once or twice at intervals of two or three weeks if the season is wet. In the first two lots applied, Paris green should be added in the proportion of 1 pound to 150 or 200 gallons, thus destroying leaf-eating insects and the codling-moth.

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*For the use of cuts we are indebted to the Cornell University Experiment Station.

At least three sprayings should be given as above, and many would advise treatment with a solution of pure copper sulphate—1 pound to 15 gallons water—before the buds burst in spring. There is some question about the importance of this early treatment, but in our own experience such treatment has usually been found advantageous.

Preparation of Bordeaux mixture.—It would seem that this most important of the fungicides should now be perfectly familiar to every orchardist; but it is still a subject of frequent inquiry. As usually prepared the mixture consists of six pounds copper sulphate, four pounds quick lime and fifty gallons water. The copper salt is dissolved in a wooden tub, the lime slaked in a separate vessel and when ready for use the two are mixed and diluted as above.

In large orchards much time may be saved by preparing stock solutions of the lime and copper instead of constantly making up a new batch. Dissolve 40 pounds of copper sulphate in as many gallons of water. A gallon of the solution will thus contain one pound of the copper salt. In a similar way a stock solution of lime may be prepared. Keep both solutions tightly covered and stir thoroughly before dipping any out. A gallon of clear lime water contains only one-sixth of an ounce of lime instead of a pound, as desired. It is now a very simple matter to take six gallons of the copper solution, four of the lime, and dilute to the requisite amount.*

Some other formulas.—The Bordeaux mixture and Paris green above mentioned are the standard remedies for orchard work. But there are some insects which are best reached by other means, and it is assumed that the orchardist knows what he is fighting before commencing operations. For currant worms, the specific—after the fruit has set—is fresh white hellebore. For the first brood of this insect we always use Paris green. Aphis and scale insects are best met with kerosene emulsion. For brown rot of plums, after the fruit has partly developed, the ammoniacal solution of copper carbonate is preferred to Bordeaux mixture, as the latter discolors the fruit.

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*This subject was fully discussed before the Maine Pomological Society in January, 1895. See Rep. Maine Pom. Soc., 1894, p. 56.

KEROSENE EMULSION.

Hard soap,	½ pound.
Boiled water,	1 gallon.
Kerosene,	2 gallons.

Dissolve the soap in the water, add the kerosene and churn through a force pump for five to ten minutes. In general, dilute about ten times before using. On very tender succulent plants dilute fifteen or twenty times, and for scale insects on woody plants dilute only five times.

HELLEBORE.

Fresh white hellebore,	1 ounce.
Water,	3 gallons.

A little flour paste added to the mixture will cause it to adhere to the foliage better.

AMMONIACAL COPPER CARBONATE.

Copper carbonate,	1 ounce.
Ammonia water,	1 quart.
Water,	9 gallons.

For this purpose take the strongest ammonia, 26 degrees Beaumé, and dilute it with seven or eight volumes of water before using. This stock solution may be kept indefinitely in closely corked bottles. Dilute as above when ready for use. Several other formulas for the solution of copper carbonate are given, but this one will be found most convenient.

There are many other valuable insecticides and fungicides, but those above named are the most important. It is hoped that the warfare against disease and insect enemies of the orchard will be waged this year as never before.

W. M. MUNSON.

THE MAINE STATE COLLEGE,
ORONO, ME., Apr. 10, 1896.